```
import numpy as np
import pandas as pd
import seaborn as sb
import matplotlib.pyplot as plt
import random as rand
from sklearn.neighbors import KNeighborsRegressor
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import train_test_split
```

```
df = pd.read_csv("car_prices.csv")
df.head()
```

	year	make	model	trim	body	transmission	vin	state	condit
0	2015	Kia	Sorento	LX	SUV	automatic	5xyktca69fg566472	ca	
1	2015	Kia	Sorento	LX	SUV	automatic	5xyktca69fg561319	ca	
2	2014	BMW	3 Series	328i SULEV	Sedan	automatic	wba3c1c51ek116351	ca	4
3	2015	Volvo	S60	T5	Sedan	automatic	yv1612tb4f1310987	ca	4
4	2014	BMW	6 Series Gran Coupe	650i	Sedan	automatic	wba6b2c57ed129731	ca	4

```
e'].str.lower()
del'].str.lower()

f['make'] == 'ford') & (df['model'] == 'f150') | (df['model'] == 'f-150')].copy()

ndex(drop=True, inplace=True)
```

```
lumns=['make', 'model'], inplace=True)

ead())
```

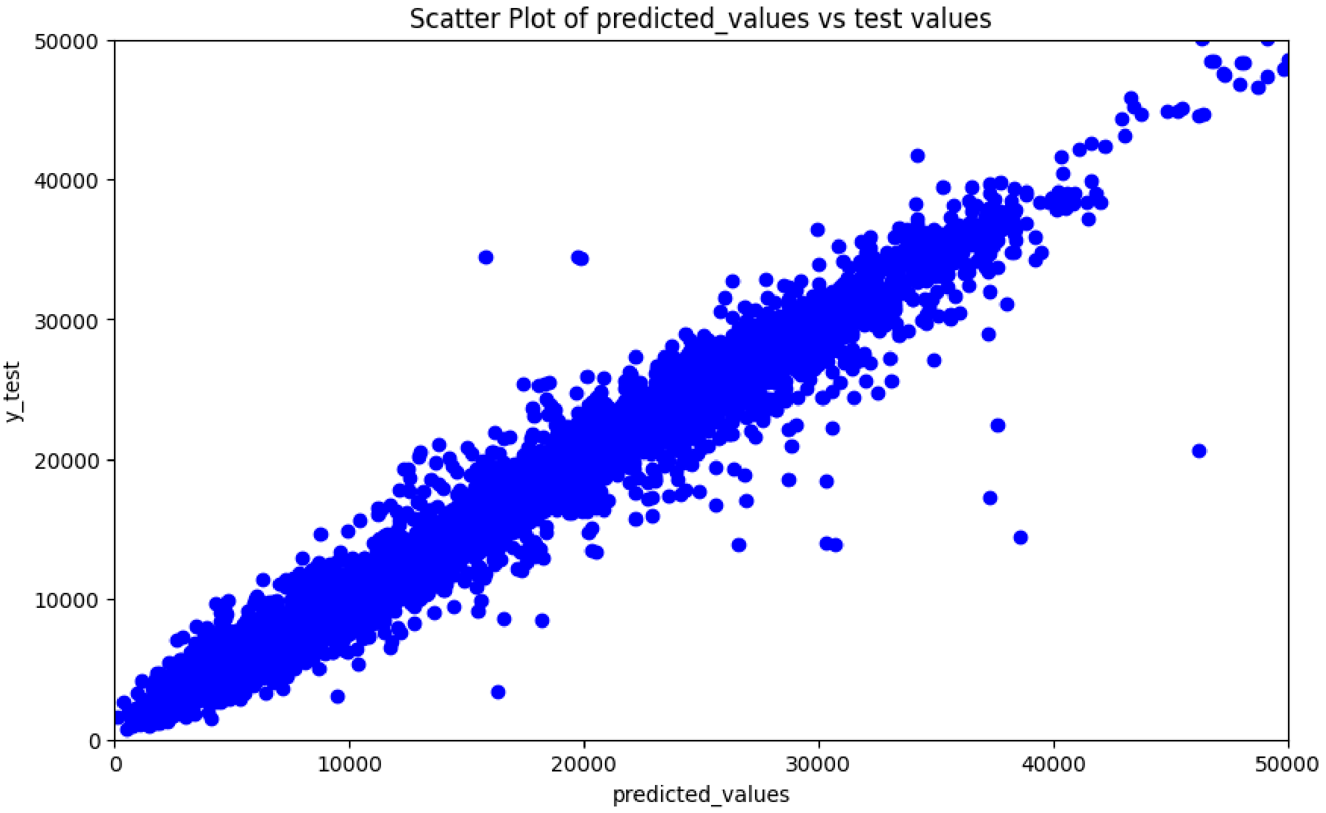
```
   year    trim       body transmission                vin state  condition  \
0  2012     XLT  SuperCrew          NaN  1ftew1cm9ckd05952    ca       46.0
1  2012     FX2  SuperCrew    automatic  1ftfw1ct0cfb64807    ca       46.0
2  2012     XLT  SuperCrew    automatic  1ftfw1et3ckd61619    ca       39.0
3  2012     XLT  SuperCrew    automatic  1ftfw1ef9cfc79834    ca       35.0
4  2012  Lariat   SuperCab    automatic  1ftfx1ef6cfc80260    ca       41.0

   odometer  color interior                           seller      mmr  \
0   51189.0   gray     gray  ford motor credit company llc pd  19700.0
1   28687.0   gray    black  ford motor credit company llc pd  26700.0
2   27465.0  black     gray  ford motor credit company llc pd  26300.0
3   93858.0  white     gray              aaero sweet company  18900.0
4   46444.0    red    black  ford motor credit company llc pd  26300.0

   sellingprice                                 saledate
0       20200.0  Thu Dec 18 2014 12:00:00 GMT-0800 (PST)
1       30500.0  Thu Dec 18 2014 12:00:00 GMT-0800 (PST)
2       28800.0  Thu Dec 18 2014 12:00:00 GMT-0800 (PST)
3       19500.0  Wed Dec 17 2014 12:15:00 GMT-0800 (PST)
4       25600.0  Thu Dec 18 2014 12:00:00 GMT-0800 (PST)
```

```
def reservoir_sampling(m, data):
  if m > len(data):
        m = len(data)
  rsdata = data.copy()
  reservoirindex = []



  for i in range(m):
    reservoirindex.append(i)
  for i in range(m, len(data)):
    j = rand.randint(0, i-1)
    if (j < m):
      reservoirindex[j] = i

  return rsdata.iloc[reservoirindex]


numerical_df = ford_f150_df.select_dtypes(include=['number'])

sampled_data = reservoir_sampling(14479, numerical_df)

cleaned_df = sampled_data.dropna()

print(cleaned_df.head())
```

```
   year  condition  odometer      mmr  sellingprice
0  2012       46.0   51189.0  19700.0       20200.0
1  2012       46.0   28687.0  26700.0       30500.0
```

```
   2  2012       39.0   27465.0  26300.0       28800.0
   3  2012       35.0   93858.0  18900.0       19500.0
   4  2012       41.0   46444.0  26300.0       25600.0
```

```
import numpy as np
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.neighbors import KNeighborsRegressor

numeric_features = ['year', 'condition', 'odometer', 'sellingprice']

for feature in numeric_features:
    cleaned_df.loc[:, feature] = pd.to_numeric(cleaned_df[feature], errors='coerce')
    cleaned_df.loc[:, feature] = cleaned_df[feature].fillna(cleaned_df[feature].mean

cleaned_df = cleaned_df.replace([np.inf, -np.inf], np.nan)

for feature in numeric_features:
    cleaned_df.loc[:, feature] = cleaned_df[feature].fillna(cleaned_df[feature].mean


X = cleaned_df[numeric_features].values
y = cleaned_df['mmr'].values

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_stat

scaler = StandardScaler()
X_train_scaled = scaler.fit_transform(X_train)
X_test_scaled = scaler.transform(X_test)

knn = KNeighborsRegressor(n_neighbors=4)
knn.fit(X_train_scaled, y_train)

predicted_values = knn.predict(X_test_scaled)

errors = predicted_values - y_test
errors = abs(errors)


plt.figure(figsize=(10, 6))
plt.scatter(y_test, predicted_values, color='blue')

plt.xlabel('predicted_values')
plt.ylabel('y_test')
plt.title('Scatter Plot of predicted_values vs test values')

plt.xlim(0, 50000)
plt.ylim(0, 50000)

plt.show()
```


Scatter Plot of predicted_values vs test values
y_test
predicted_values
0
10000
20000
30000
40000
50000
0
10000
20000
30000
40000
50000